

## **ACCELERATING RURAL ECONOMIC GROWTH IN THE WEST BANK**

**Improving Lives through a  
Dairy Quality Improvement Project**

**USAID Grant PCE-G-00-00-00043-00**

### **FINAL REPORT**

**September 30, 2000 – September 29, 2004**

*S.O. 1 Economic growth through the enhancement of enterprise development.*

#### **Submitted by**

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#### **Submitted to**

EGAT/AG/AM  
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IN THE WEST BANK  
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The purpose of the meeting was for Land O'Lakes to officially donate (through a ceremonial signing) its project assets and technical materials. The PFIA plans to carry on the dairy industry work that Land O'Lakes began by continuing to work with farmers and dairy processors in the West Bank and implementing new programs and projects that will help to "increase the local production and further develop the industry." The PFIA credits Land O'Lakes with "enormously developing our dairy products industry to take over 50 percent of local market share."

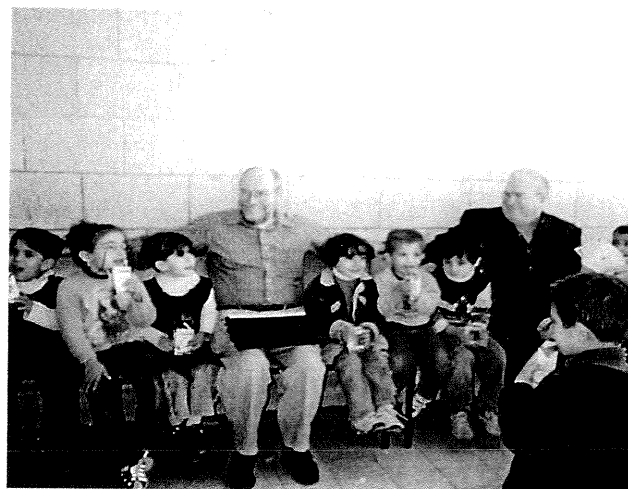
# **Attachment A**

## **PHOTO GALLERY**

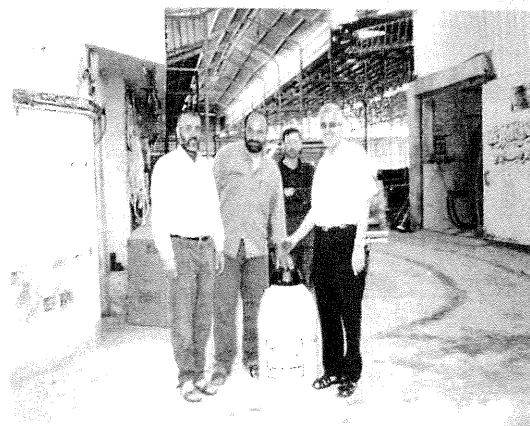
A group of school children after taking their share of "One Cup of Milk"



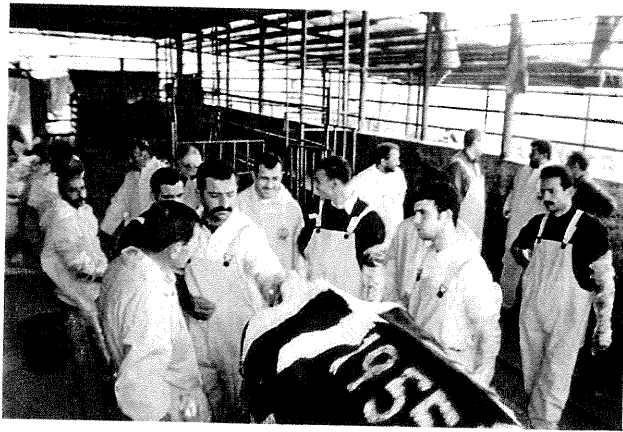
Jim Herne and Wahib Tarazi shared a cup of milk with schoolchildren.



Cryogenic Containers



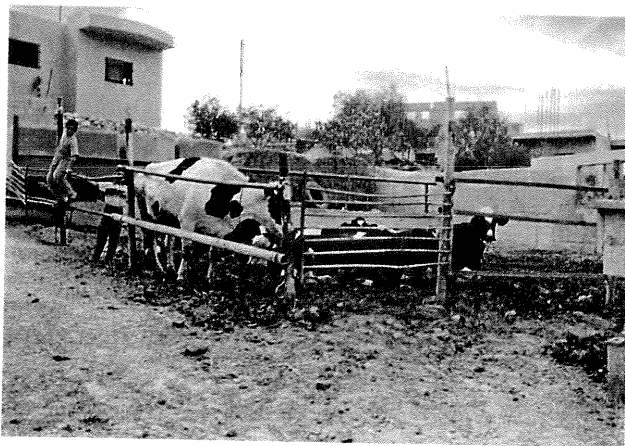
Distributing cryogenic containers to farmers, who contributed 50 percent of the cost.



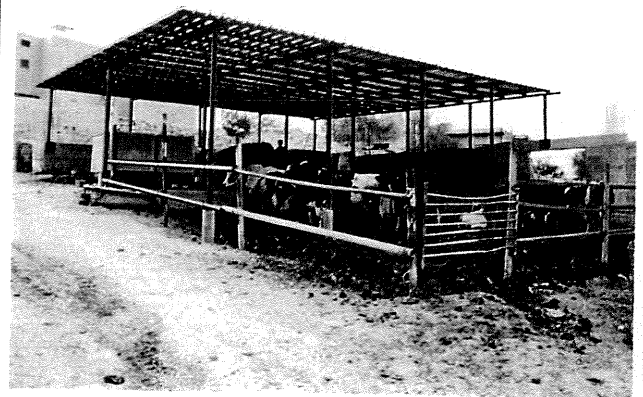
Artificial Insemination Training



Artificial Insemination Training



Innovative Farm Before



Innovative Farm After

# **Attachment B**

## **RESULTS TABLES**

**Table 1: Overall Project Results**

<b>Objective</b>	<b>Status as of September 2001 *</b>	<b>Status at Project End</b>
Increased milk production in Nablus and Tulkarm area	80,000 liters per day	107,700 liters per day
Increased milk production in Hebron area	40,000 liters per day	52,000 liters per day
Increased number of dairy cattle in Nablus and Tulkarm area	4,000 dairy cows	4,930 dairy cows
Increased number of dairy cattle in Hebron area	2,100 dairy cows	2,245 dairy cows
Increased quantity of milk to dairy plants in Hebron area	44,500 liters per day (as of March 2002)	45,000 liters per day
Increased quantity of milk to dairy plants in Nablus area	7,000 liters per day	12,800 liters per day
Genetics Program: Revolving Ewes Program	30 Awassi ewes distributed under revolving ewes loan program	118 improved ewes born; 260 total sheep born, total value \$78,000
Innovative Farms	None	Total of 21 innovative farms implemented
School Feeding Program	None	Total: 744,954 packages of UHT milk distributed
Birzeit University survey and training program	--	Survey for 14 dairy plants. Training for six technicians.

\* Baseline data prior to this date not available.

## RESULTS OF DAIRY NUTRITIONAL AWARENESS CAMPAIGN

**Table 2: Women Extension and Nutrition Program (Bethlehem)**

Type of activity	Total number of participants	Participants consuming recommended amounts of milk before training session	Participants consuming recommended amounts of milk after training session	Percent increase
Nutritional programs for students	50	20 (40%)	45 (90%)	50%
Nutritional session	40	10 (25%)	33 (82.5%)	57.5%
School milk program	1972	650 (33%)	1775 (90%)	57 %
Pregnant/ lactating women counseling	33	15 (45.5%)	29 (88%)	42.5%
Nutritional educational course	35	18 (51%)	31 (88.5%)	37.5%
Media awareness	7 radio programs on radio Bethlehem 2000 7 frequency			

**Table 3: Women Extension and Nutrition Program (Hebron)**  
(Statistics as of March 2004)

Type of activity	Total number of participants	Participants consuming recommended amounts of milk before training session	Participants consuming recommended amounts of milk before training session	Percent increase
Nutritional educational course	174	122 (70%)	132 (76%)	6%
Pregnant/lactating women counseling	84	65 (77%)	81 (96%)	19%

**Table 4: Women Extension and Nutrition Program (Tulkarm)**

<b>Type of activity</b>	<b>Total number of participants</b>	<b>Participants consuming recommended amounts of milk before training session</b>	<b>Participants consuming recommended amounts of milk before training session</b>	<b>Percent increase</b>
Nutritional educational session of women	500	95 (19%)	360 (72%)	53%
Nutritional educational session of student in schools	2164	1230 (57%)	1659 (77%)	20%
Nutritional educational session of children in kindergartens	1455	848 (58%)	1289 (89%)	31%
Workshop and demonstration trip	400			

## **Attachment C**

# **INNOVATIVE FARMS IMPACT**

## Innovative Farms Impact

#	Farmer's Name	Location	Square Meters Available	Shed Area Added, in Square Meters	Project's Contribution		Beneficiary's Contribution		Before		After	
					USD	%	USD	%	Cows	Milk	Cows	Milk
1	Nabil Hamoudeh	Tulkarm	200	100	1166	26.7%	3187	73.2%	10	240	15	350
2	Khaled M. Awad	Tulkarm	500	120	1488	22.4%	5130	77.6%	26	550	28	590
3	Khader Ashayqah	Tubas	350	170	1513	38.6%	3916	61.4%	7	160	27	600
4	Imad Abu Asbeh	Jenin	250	120	1404	36.5%	3902	63.2%	36	800	45	1080
5	Talal Al-Saifi	Nablus	60	100	1387	30.4%	3167	56.2%	10	230	12	270
6	Nafe'a Sawalha	Nablus	85	120	1514	27%	4088	63%	15	280	17	320
7	Basmah Hussein	Nablus	0	110	1432	11.3%	10682	86%	5	110	12	250
8	Ahmad Ibrahim	Nablus	45	120	1495	29.4%	3583	58.3%	13	250	15	300
9	Ahmad Salem	J. Valley	65	120	1250	35.5%	2270	64.5%	6	100	10	180
10	Yousef Sukkar	Qalqelia	650	110	1162	25.9%	3315	65%	70	1150	110	1650
11	Mohamad Hasan	Nablus	32	-	1559	13.5%	9940	86.5%	40	850	60	1000
12	Ammar Affori	Nablus	280	120	1225	33.7%	2402	66.3%	30	500	65	1100
13	Moh'd Dwaikat	Nablus	80	110	1179	23.7%	3782	69%	13	220	20	340
14	Moh'd Ramadan	Tell	80	126	1207	33.8%	2364	66%	16	220	20	400
15	Abdelfatah Aref	Tell	100	130	1326	35.4%	2538	65.5%	8	170	12	250
16	Ismael Ramadan	Tell	30	120	1335	34.5%	2538	65.5%	10	200	10	220
17	Ibrahim Yamin	Tell	40	120	123	38.8%	1953	61%	15	300	20	420
18	Mahmoud Ganourm	Roujeeb	100	125	1295	24.6%	3955	75%	20	450	30	600
19	Edrees Hraish	Betonia	200	120	1644	34.7%	3083	65%	24	500	44	780
20	Ziad Zayed	Aqraba	100	120	1348	60%	3105	40%	5	120	-	-
21	Mohamad Hanani	Beit Furik	120	110	1269	50%	3649	50%	10	240	-	-

## **Attachment D**

# **SURVEY OF DAIRY PLANTS**

**By Birzeit University**



## Survey of Dairy Factories

By Birzeit University  
Center for Environmental and Occupational Health Sciences

### Introduction

This survey was carried out by the Center for Environmental and Occupational Health Sciences (CEOHS) and was supported by a grant from Land O'Lakes. This survey was supposed to be done a long time ago, but it was postponed due to closures, curfews and the political situation.

Our previous work on dairy products and production indicated that companies have certain weaknesses in both dairy production and quality control and quality management that may give rise to a negative image for their products amongst Palestinian consumers. Thus comes the need for this type of survey to shed the light on the status of the dairy producers and to try to pinpoint the weaknesses and recommend measures to rectify it.

### Objectives

1. To evaluate the dairy factories from all aspects of the industry such as building, facilities, location, management, employees, products, production lines, quality systems, and mainly the laboratory.
2. To evaluate the laboratory according to:
  - a. the instruments present and used to carry out the tests.
  - b. the employees working in the laboratory, their experience, education, and training.
  - c. the tests that are carried out in the laboratory.
  - d. the procedures or reference methods used to do the tests.
  - e. the needs of the laboratory and employees.

### Methodology

All factories were visited on site to see how they operate, observe production lines, and to see if the products are produced according to Good Manufacturing Practices (GMP) and Quality Control / Assurance system.

An inspection report was filled for each factory that included the following:

1. Company background
2. Production process and list of products
3. Company organization
4. Number of employees
5. Company area size and dimensions and location.
6. Working hours
7. Facilities
8. Fire protection
9. Housekeeping
10. Environmental health and safety
11. Health and safety
12. Cafeteria food services

13. Laboratories
14. Quality control system

## Results

Fourteen dairy factories were visited in the West Bank during the course of the survey. Below is a table of thirteen factories surveyed. Al Sharq dairy factory in Hebron was also visited but was not open for business yet. Al Najah dairy factory at Khadouri, Tulkarm, was not inspected as it is a teaching factory that belongs to Al Najah University.

**Table 1: Name and Location of Dairy Factories Surveyed**

<b>Name</b>	<b>District</b>
Al Rayyan	Ramallah
Pinar	Ramallah
Al Marai	Ramallah
Hammoudah	Sawahra
Arab Development Society	Jericho
Al Natsheh	Hebron
Mjahed (Al Safi)	Hebron
Al Juneidi	Hebron
Saffa	Nablus
Quisi	Tulkarm
Tulkarm Live Stock Cooperative	Tulkarm
Zem Zem	Qalqilia
Al Arabia	Qalqilia

## Capacity

Only the factories listed below comply with some or all the requirements and regulations for dairy processing:

1. Al Juneidi in Hebron
2. Al Safa in Nablus
3. Al Jebrini in Hebron
4. Hammoudah in Sawahra
5. Pinar in Ramallah

These factories could cover the West Bank and Gaza Strip Markets since they are distributed in the north, middle, and south of West Bank. The rest of the factories such as Tulkarm Livestock Cooperative, Zem Zem, Al Arabia, and Al-Natsheh distribute on a local and small level.

At Al Natsheh, the owner and one employee work. They produce about 300 kg or less daily. Arab Development Society is a factory but most of the equipment is old and not working. Al Marai produces only cheese and Labneh, which could be covered by other factories.

## Setup

Some of the factories have fire alarm systems, some have fire extinguishers, and some have neither.

None of the factories had a list of all hazardous chemicals used in the factory or any written instructions on how to use these chemicals and associated safety measures.

None of the factories had health records for employees. A health record means a check-up before hiring and a regular check-up throughout the year. Three factories ask for a health report when an employee becomes sick.

Only two factories, Al Juneidi in Hebron and Al Saffa in Nablus, have an internal quality control system. It is not a complete system and needs work to improve it. None of the factories have any certification of quality control such as ISO or HACCP.

Most factories wish to produce yellow cheese but do not have the technical know-how and the equipment, although such a product is highly marketable.

## Evaluation of Laboratories

Eight factories, representing only 5.7 percent, have laboratories. These are:

1. Pinar
2. Al Marai
3. Hammoudah
4. Arab Development Society
5. Al Juneidi
6. Al Jebrini
7. Al Arabia
8. Al Saffa

These laboratories are poorly equipped. Some of the instruments are very old, and it is hard to tell how accurate they are since calibration is not done for these instruments. Not all tests are carried out by these laboratories except for Al Juneidi and Al Safa, who can do the majority of the tests required by the Palestinian Standard.

**Table 2: Instruments that are present or absent in each laboratory of the eight factories with laboratories.** Key: X = Absent; √ = Present

Instrument	Company							
	Pinar	Al-Marai	Hamoudeh	ADS <sup>1</sup>	Juneidi	Jabrini	TLSC <sup>2</sup>	Safa
Incubator	√	√		√	√	√	√	√
pH meter	√	√	√		√	√	√	√
Water bath	√	X	√	√	X	√	√	√
Balance	√	√	√	√	X	√	√	√
Microscope	√	√	X	X	√	√	√	X
Hot Plate	√	√	X	X	X	X	X	X
Gerber Centrifuge	√	X	√	√	√	√	√	√
Computer	√	X	X	X	X	X	X	X
Refrigerator	√	√	X	√	X	X	X	X
Oven	√	X	X	X	√	X	X	X
Autoclave	√	√	√	√	√	√	√	√
Lactometer	√	X	√	X	X	X	X	X
Refractometer	√	X	√	X	X	X	X	X
Salinimeter	√	X	X	X	X	X	X	X
Milk O Scan	X	X	X	X	√	X	X	X
Scientific journals	X	X	X	X	X	X	X	X
Books	X	X	X	X	X	X	X	X
References	X	X	X	X	X	X	X	X
Methods manual	X	X	X	X	X	X	X	X
Sterile Hood	X	X	X	X	√	X	X	X
Pipettors	X	√	X	X	X	X	X	X
Densitometer	X	√	X	X	X	X	X	√
Distiller	X	X	√	X	X	√	X	
Acidometer	X	X	X	X	X	X	X	√
Butyrometer	X	X	X	X	X	X	X	√
Microwave	X	X	X	X	√	X	X	X
Cryoscopy	X	X	X	X	√	X	X	X
Colony counter	X	X	X	X	√	X	X	X
Spectrophotometer	X	X	X	X	√	X	X	X
Dessicator	X	X	X	X	X	X	X	X
Stomacher	X	X	X	X	√	X	X	X

<sup>1</sup>ADS = Arab Development Society

<sup>2</sup>TLSC = Tulkarm Livestock Cooperative

**Table 3: Tests that are performed by each laboratory****Key: X = Absent; √ = Present**

<b>Test</b>	<b>Company</b>							
	Pinar	Marai	Hamoudeh	ADS <sup>1</sup>	TLSC <sup>2</sup>	Jabrini	Safa	Juneidi
Total Count	√	√	√	√	X	√	√	√
Total Coliforms	√	√	√	√	X	√	√	√
Yeasts & Molds	√	√	√	√	X	√	√	√
Salmonella	√	X	X	X	X	X	X	X
Staphylococcus aureus	√	√	X	X	X	X	√	X
Fecal Coliforms	√	√	√	√	X	X	√	√
Fecal Streptococcus	X	X	X	X	X	X	X	X
Antibiotics	X	X	X	X	X	X	X	X
Fat	√	X	√	X	√	√	√	√
Density	√	√	√	√	√	√	√	√
pH	√	√	√	√	√	√	√	√
Acidity	√	X	√	X	X	√	X	√
Total Solids	√	X	√	√	X	X	X	√
Ash	X	X	X	X	X	X	X	X
Protein	X	X	X	X	X	X	X	X
Coagulation By Boiling	X	X	√	X	√	X	√	√
Coagulation By Alcohol	X	X	√	X	√	X	√	√
Lactose	X	X	X	X	X	X	X	X
Alkaline Phosphatase	X	X	X	X	X	X	√	√
Fat Free Dry Matter	X	X	X	X	X	X	X	X
Preservatives	X	X	X	X	X	X	X	X
NaCl	X	X	X	X	X	X	X	X
KCl	X	X	X	X	X	X	X	X
Starch	X	X	X	X	X	X	X	X
Penicillin	X	X	X	X	X	X	√	√
Anaerobes	X	X	X	X	X	X	√	X
Moisture	X	X	X	X	X	X	X	√

<sup>1</sup>ADS = Arab Development Society<sup>2</sup>TLSC = Tulkarm Livestock Cooperative

## Discussion

Throughout the visits, it was evident that most employees and management of all factories have not attended food safety and HACCP training. It is highly recommended that these programs be offered to all factories on a regular basis.

None of the factories had any kind of in-house training on what to do in case of fire. They do not have hone lists of the important people to call such as fire department, police, and management of the factory, ambulances, or hospitals. They need intensive training in this matter.

Intensive training is also needed on handling hazardous materials, and the type of safety measures to consider when using these materials, especially chemicals.

Each and every factory needs a system to track employee health records and regular checkups throughout the year.

Al-Juneidi and Al-Safa are the only factories that have some internal quality control system, but it lacks documentation, instructions, tracking system, food safety and HACCP training.

## Training Program

The training program for the laboratory technicians in the dairy industry was held September 20-25, 2004. The schedule was as such:

### Food Chemistry Analysis Training Program:

#### Day 1, September 20

##### **Tests to be carried out:**

- Ash
- Moisture
- Density
- pH
- Total Solids
- Coagulation By Boiling
- Coagulation By Alcohol
- Fat Free Dry Matter

#### Day 2, September 21

- Fat
- Acidity

#### Day 3, September 22

- Starch
- Protein
- Alkaline phosphatase

#### Day 4, September 23

- Starch
- Protein
- Alkaline phosphatase

#### Day 5, September 25

- ICP- NaCl, KCl
- HPLC- Sorbates and Benzoates

**Dairy samples used for chemical analysis:**

<u>Tests</u>	<u>Samples</u>
Ash:	Raw Milk, Cheese, Lebneh
Moisture:	Raw Milk, Cheese, Lebneh
Total Solids:	Raw Milk
Acidity:	Raw Milk, Lebneh, Yogurt Drink
pH:	Raw Milk, Lebneh, Cheese, Yogurt, Yogurt Drink
Coagulation By Boiling:	Raw Milk
Coagulation By Alcohol:	Raw Milk
Fat:	Raw Milk, Cheese, Lebneh
Protein:	Raw Milk, Lebneh, Cheese
Alkaline phosphatase:	Pasteurized Milk
Starch:	Lebneh, Chocolate pudding
Fat Free Dry Matter:	Lebneh, Yogurt, Yogurt Drink
NaCl:	Lebneh, Cheese
KCl:	Lebneh, Cheese
Potassium Sorbate:	Lebneh, Yogurt, Yogurt Drink
Sodium Benzoate:	Lebneh, Yogurt, Yogurt Drink

**Food Microbiology Analysis Training Programs:**Day 1, September 20**Tests to be carried out:**

Introduction  
 Good Laboratory Practice  
 Calculations  
 Media preparation

Day 2, September 21

*Salmonella pre-enrichment*  
 Total Aerobic Count  
 Yeasts and Molds  
*Staphylococcus aureus*  
 Total Anaerobic Count

Day 3, September 22

*Salmonella Enrichment*  
 Total Coliforms  
 Fecal Coliforms  
*Lactobacillus*  
*Enterococcus faecalis*  
 Noter Microbiology  
 - Heterotrophic Plate Count  
 - Total Coliforms  
 - Fecal Coliforms  
 - *Pseudomonas aeruginosa*  
 - *S. aureus*  
 - *E. Faecalis*

Towards the end of the program, the participants completed an evaluation form for the program. The participants were very impressed and pleased by the training program, according to the evaluation they have given the program. The form was in Arabic. Below is a translation of the evaluation form:

**Table 5: Training Program Evaluation Results**

		Excellent	Very good	Fair	Bad
1	Do you think the program will help in your professional life?	5			
2	Do you think preparation and facilities for the program were enough?	5			
3	Do you think that you have gained new techniques and technology?	5			
4	Do you think you have gained new information?	5			
5	Do you think the program fulfils your professional needs?	5			
6	Do you think the training material covers the chemical/microbial analysis of dairy products?	5			
7	Do you think, that observation and actual work with your hands were enough and available for everybody?	5			
8	Do you think that working with your hands covers the training material?	5			
9	Do you think the theoretical part was enough?	5			
10	Do you think that presentation of the subject was easy and understandable?	5			
11	Do you think the time for the training program was enough?	5			
12	Do you think the trainers were cooperative?	5			
13	In general, do you think that the training program achieved its aims?	5			
<b>Recommendation:</b>					

To receive the final certificate, each participant had to pass a quiz about the training program. Each participant received his/her share of the expense, which was \$120 each. It is regrettable not to do the whole training program proposed earlier, especially the food safety and HACCP training, because it was greatly needed by the employees of the factories including the management.

## Conclusion

This evaluation was needed to determine further steps to be carried out to improve production and quality at dairy factories. It is regrettable that Land O'Lakes, which has a great deal of experience in work of a similar nature, has closed its activities in Palestine. CEOHS wishes to encourage Land O'Lakes to resume its activities especially in the area of dairy production and processing. CEOHS is open for future cooperation in this and other fields.

It was evident that dairy producers need a great deal of training and technical assistance in both GMP and QC work.